Space Weather Forecast

Issued on Thursday, 07 September 2023 at 01:14 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate-class flares (R1-R2 radio blackouts).

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Low in the past 24 hours with several Common-class flares. There are currently eight sunspot groups on the visible disc. West of centre disc a moderately sized region has some magnetic complexity and continues to grow in both areal extent and number of spots. A further region in the northeast has also grown, with the trailing spot penumbra increasing in area. Two further regions have recently emerged over the northeast limb, and are most likely not yet fully visible due to the viewing angle. The other regions remain relatively small and simple.
Within the background of a likely large far sided Coronal Mass Ejection (CME), a smaller and slower CME was seen emerging in the southwest from a region that produced a Common-class flare. This is considered likely to have some Earth-directed component, with an estimated arrival time of late on 09 Sep, although with low confidence.

Solar Wind / Geomagnetic Activity: The solar wind was mostly at slightly elevated levels. Wind speeds varied between 380-440 km/s. The Interplanetary Magnetic Field was weak throughout, with the north-south component varying weakly. Geomagnetic activity was Quiet to Unsettled (Kp 0-3).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary
Solar Activity: There is a chance of Moderate-class flares throughout the period, mostly from the two larger regions on the disc, with a still somewhat uncertain contribution from the two new regions near the northeast limb, with these not yet at a good viewing angle for analysis.

Solar Wind / Geomagnetic Activity: There are two possible CMEs in the current forecast. The first is expected to be a glancing blow at worst late Day 1 or early Day 2 (07-08 Sep). A second CME is estimated to arrive late on Day 3 (09 Sep). This was extremely difficult to analyse due to the background of other CMEs, which reduces confidence in this forecast. Weak coronal hole fast wind enhancements are possible from late Day 1, but more likely Day 2 (08 Sep), and again on Days 3 into 4 (09-10 Sep).
Geomagnetic activity is expected to be mostly Quiet to Unsettled, but with a risk of Active intervals with any fast wind or CME influence. There is also a slight chance of isolated G1/Minor Storm intervals, this is most likely later Day 3 into Day 4 in association with the second CME.

Energetic Particles / Solar Radiation: Solar radiation storms are unlikely, with a very slight chance of an enhancement should any larger flares occur from the two largest regions on the disc, especially later in the period.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	10	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	50	50	50	50
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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